

10/657,736

**IN THE ABSTRACT**

Please replace the abstract of the invention with the following:

—A system and method for converting an analog voltage signal to a digital representation at high speeds, known as an analog to digital converter (A/D converter), is provided in the form of an N-bit A/D converter, made by N superconducting, preferably HTC, transmission lines. The N lines are arranged adjacently and in parallel with each other. On each line  $2^{N-1}$  Josephson Junctions (JJs) are embedded in series. The JJs form a matrix over the configuration of the N superconducting transmission lines. A scanning electron beam is made to impinge on this arrangement across the lines at a high frequency, while it is deflected by the applied voltage signal along the direction of the lines. A voltage step is generated upon hitting any one of the JJs. In this manner upon each cross-scanning of the beam, an N-bit step voltage pattern is generated on the lines. --